REVISION OF SEASONALLY ADJUSTED INDEX OF VARIETY-STORE SALES

The monthly index of sales of variety chain stores published regularly in the SURVEY OF CURRENT BUSINESS is one of a series of retail sales indexes prepared by the Bureau of Foreign and Domestic Commerce to measure changes in the volume of consumer purchasing and to furnish store operators with a standard with which to compare their sales volume. The series was originally presented and described in the March 1934 issue of the SURVEY OF CURRENT BUSINESS.

A complete revision of the seasonally adjusted index and a recompilation of both the adjusted and unadjusted series from a 1929–31 base to a 1935–39 base is presented below.[1] No change has been made in the reporting sample of stores or the method of computation of the unadjusted index aside from the change in the base period. The unadjusted index is based on dollar sales figures provided by a cooperating group of seven variety chain organizations doing more than 75 percent of the business in that field. The series reflects the trend of sales of a constant number of stores, composed, insofar as possible, of identical units, thus eliminating the effect on sales totals of changes in the number of store units operated by companies in this field. Allowance is made for the differences in the number of business days in the month and for the sales importance of the different days of the week.

The revision in the seasonally adjusted series has been made primarily to allow for changes which have been taking place during recent years in the seasonal pattern of sales made through this type of store. Certain shifts in the proportion of total annual sales normally made in the various months of the year have been evident for some time, but no attempt was made to revise the data until the changes became more definitely established.[2]

Among the more significant changes which have occurred during the past 10 years in the seasonal distribution of sales is an appreciable rise in the relative importance of December business. Changes in the number and quality of items handled by variety stores to include an increasing volume of commodities which have a heavy Christmas demand account for much of this change. Similarly, a rather pronounced rise in the importance of June business has taken place during the last decade, while July also accounts for a slightly larger proportion of annual sales in comparison with earlier years. October suffered the most pronounced loss in sales importance, although February and May also experienced a measurable decline. No shift of any consequence occurred in the other months of the year.

Since a large volume of variety sales is associated with the Easter season, and since the date of Easter varies between March and April, a special adjustment is necessary to compensate for this element of fluctuation in the sales totals recorded for these months. The revised index also incorporates newly computed correction factors derived from data which have become available since the original series was presented. At that earlier date it was considered impracticable to derive Easter correction factors entirely from the limited number of years for which comparable variety-store sales data were available. Hence, experience with department-store sales was given weight in determining the correction factors. The new correction factors are based exclusively on variety-store sales experience and indicate a more substantial concentration of the Easter trade within the 10 days immediately preceding Easter.[3] Therefore, they differ considerably from those formerly used.

It is apparent from examination of the unadjusted index of variety-store sales that the amplitude of the seasonal variation in December is affected by the cyclical position of business. When business is expanding, December sales usually rise considerably more than the average December increase; and when business is declining, December sales rise considerably less than the average December increase. As a high degree of correlation was found between the December rise and the cyclical level of previous months, this factor was taken into account in the adjusted series in order to eliminate the continuous December peaks and troughs which would otherwise have appeared.[4]

An opposite tendency, although less well defined, may also be present in the behavior of January sales. That is, January sales give some evidence of being affected by the relative sales volume of the preceding month. In a year when December is much above normal seasonal expectations, the following January tends to be substandard, and vice versa. No attempt to adjust for this variation will be made, however, until data for additional years establish the movement more accurately.

In appraising the significance of month-to-month changes in the adjusted variety-store sales index, it should be noted that a change of less than two points between successive months cannot be regarded as of particular moment unless part of a sustained trend extending over more than two consecutive months. This results from the fact that movements of variety sales contain a considerable erratic element which cannot be eliminated by systematic adjustment of the data.

[1] This revision was prepared by Howard Grieves, Chief of the Statistical Research Section, with the assistance of Reba Osborne. The change of base period has been made upon the recommendation of the Central Statistical Board, which seeks a more recent base period and a greater degree of uniformity in general-purpose index numbers prepared by Federal agencies. Other retail-trade indexes prepared by the Bureau will be shifted to the new base period when revisions are completed.

[2] The new seasonal adjustment factors were computed by the "ratio to moving average" method. To ascertain the existence of and to measure changes in the seasonal pattern, the ratios to moving averages of all the Januarys, Februarys, etc., were plotted chronologically from 1929 through 1939. A smooth curve was then drawn through the plotted points for each month and the seasonal adjustment factor for each year read from the curve, after which the monthly factors for each year were adjusted to equal 1,200. A further modification is described in text footnote 4.

[3] The corrections for Easter applied to the basic seasonal adjustment factors are as follows: *For March.*—If Easter falls before April 2, +0.5; on April 5, −1; on April 9, −3.3; after April 10, −4.8. *For April.*—Before April 2, −6.5; on April 5, +1; on April 9, +3.3; after April 10, +4.8. The reason for the greater correction when Easter occurs at extremely early dates, 6.5 points compared with the 4-point correction for late occurrences, is technical in nature and results from the fact that the prevalence of April Easters tends to bias upward the basic April adjustment factor to which the Easter correction is applied.

[4] Ordinarily the monthly correction factors for each year are so distributed over the 12 months that they total 1,200. In this case, however, if adequate allowance is made for the large December variation, the sum of the monthly correction factors for most years differs by such a wide margin from the conventional total that this procedure would result in seriously disturbing the adjustments for the other months. The distribution of differences of large magnitude is a very complex problem for which no satisfactory solution is yet available.

Consideration of the magnitude of the December variation and its close positive correlation with the average level of variety-store sales in the immediately preceding months suggests the desirability of a somewhat different treatment. That is, the correction factors actually used in preparing the seasonally adjusted index were not made to add to 1,200 for each year to compensate for the wide December variations. Although the average of the adjusted series for a specific year may therefore differ from that of the unadjusted data by somewhat more than is customarily considered desirable, it should be noted that the cyclical nature of the differences tends to render them offsetting over a period of years.

This method of adjustment has the additional advantage of making it possible to compute directly the appropriate correction factor for December on the basis of the influence which seems to be the primary element in the December variation, namely, the level of variety-store sales during the immediately preceding months. The December seasonally adjusted index without the cyclical correction may be readily computed by any reader who prefers to see the peaks and troughs in the December data. This may be done by simply dividing the unadjusted index shown in table 30 by the appropriate correction factor taken from footnote 2 of table 30.

The special corrections for December, added to or subtracted from the seasonal adjustment factors shown in footnote 2 of table 30 were computed as follows: The ratio of the unadjusted index of December sales to the 12-month average centered at that month was determined for each year. From such ratios were subtracted the December seasonal adjustment factors shown in footnote 2 of table 30. The differences were plotted against the averaged unadjusted variety sales index for the 6 months immediately preceding December in each year. A high degree of correlation (+93.0) was found. A straight line was fitted by least squares yielding the following expression: $Y = .92x - 85.9$, where Y equals the special December correction and X equals the average level of the unadjusted variety-store sales index of the 6 months preceding December.

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NEW OR REVISED SERIES

TABLE 30.—INDEX OF DOLLAR SALES OF VARIETY CHAIN STORES, 1929–40

[Daily average basis; 1935–39=100]

Month	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
WITHOUT SEASONAL ADJUSTMENT												
January	75.7	74.6	72.8	67.0	62.2	71.1	88.1	88.6	71.3	72.0	76.0	76.1
February	87.4	85.4	79.9	73.6	66.5	74.0	76.9	74.5	82.4	79.7	80.8	83.5
March	100.3	87.6	88.7	80.4	84.6	88.4	76.2	81.4	93.5	82.8	90.2	99.3
April	90.0	102.9	87.4	78.5	78.0	88.6	94.1	97.0	90.2	96.5	99.8	93.1
May	110.0	99.0	98.3	84.0	78.2	91.8	87.2	98.1	98.6	92.0	97.6	101.7
June	102.8	93.4	92.3	78.6	80.1	87.5	87.3	100.2	102.9	92.2	97.1	99.6
July	97.4	88.3	88.6	71.2	78.4	80.8	83.1	93.8	93.2	88.2	92.5	
August	96.8	87.6	81.7	80.7	77.5	81.0	80.4	87.7	91.8	86.4	90.8	
September	104.0	93.8	89.3	79.1	83.6	88.7	83.9	89.2	101.2	95.4	97.5	
October	113.1	103.6	94.1	82.4	88.1	92.6	94.7	101.7	103.8	99.8	104.4	
November	112.7	101.2	94.4	82.9	88.9	94.2	98.4	106.8	104.2	103.5	109.9	
December	206.2	167.7	165.9	134.6	155.8	165.2	180.8	193.4	200.3	196.3	209.4	
Annual index	108.0	108.4	95.1	81.9	82.6	91.6	92.9	100.8	103.6	98.3	103.5	
WITH SEASONAL ADJUSTMENT												
January	103.1	101.7	97.2	91.4	84.8	97.0	93.1	93.6	97.4	99.2	101.9	101.9
February	105.8	103.5	96.9	89.2	80.6	89.7	93.3	93.7	103.8	100.4	101.9	105.8
March	106.2	105.3	96.6	86.2	78.2	94.1	94.5	97.1	104.4	99.0	102.1	106.4
April	107.2	102.0	100.5	87.0	76.9	93.0	94.3	97.2	102.9	98.6	99.9	103.2
May	110.8	99.2	96.9	84.8	80.4	93.1	89.0	101.5	105.8	95.1	100.9	105.2
June	110.8	100.9	96.1	82.9	83.7	90.7	90.2	103.7	106.8	95.8	101.1	104.4
July	109.6	99.3	99.5	79.9	84.9	90.9	92.7	105.9	105.2	97.7	101.6	
August	111.8	98.8	93.1	79.4	88.6	92.9	91.6	99.9	104.7	98.5	103.6	
September	106.0	97.4	93.8	82.1	85.9	90.1	85.6	143.1	105.2	99.4	101.5	
October	103.0	103.3	91.7	80.7	86.8	91.2	94.4	101.7	103.5	100.7	105.2	
November	108.3	98.2	91.6	80.4	86.4	91.5	95.7	103.9	101.3	100.7	106.9	
December	105.2	99.2	91.2	77.6	87.5	92.8	92.4	100.7	102.5	100.6	104.7	

Seasonal Adjustment Factors for Variety Store Sales, 1929–40

Year	January	February	March [1]	April [1]	May	June	July	August	September	October	November	December [2]
1929	73.4	82.6	94.5	80.5	99.8	92.0	88.9	87.9	96.3	103.7	103.1	196.0
1930	73.3	82.5	84.0	100.8	99.8	93.4	88.9	87.8	96.3	103.1	103.1	169.2
1931	73.3	82.5	88.9	89.9	99.8	94.0	89.1	87.8	96.2	102.6	103.1	155.1
1932	73.3	82.5	84.4	89.4	99.1	94.7	89.1	87.8	96.3	103.1	103.1	173.4
1933	73.3	82.5	88.9	98.8	98.5	95.7	89.2	87.8	96.2	101.6	103.0	178.2
1934	73.3	82.5	84.8	89.9	98.0	96.5	89.4	87.8	96.2	103.9	102.9	183.0
1935	73.2	82.4	85.8	99.8	97.3	96.8	89.9	87.7	96.1	103.8	102.8	185.8
1936	73.8	79.5	84.3	99.3	96.7	97.4	90.6	87.8	95.2	103.0	103.0	187.0
1937	73.2	79.4	94.3	89.3	96.7	96.9	90.1	87.7	96.1	99.4	102.8	189.4
1938	73.2	79.4	85.7	99.7	96.7	96.5	91.3	87.7	96.9	98.5	102.8	195.2
1939	73.2	79.3	84.4	99.2	96.7	96.0	91.6	87.6	96.0	98.3	102.8	200.6
1940	73.2	79.3	94.2	89.2	96.7	95.8	91.6	87.7	96.1	98.4	102.9	

[1] Includes Easter adjustment.

[2] Includes special December correction described in text footnote 4. The basic seasonal factors to which the special correction was applied are as follows in order from 1929 through 1940: 167.7; 167.8; 168.1; 168.2; 168.6; 168.9; 190.2; 191.0; 193.8; 194.2; 195.1; 195.4.

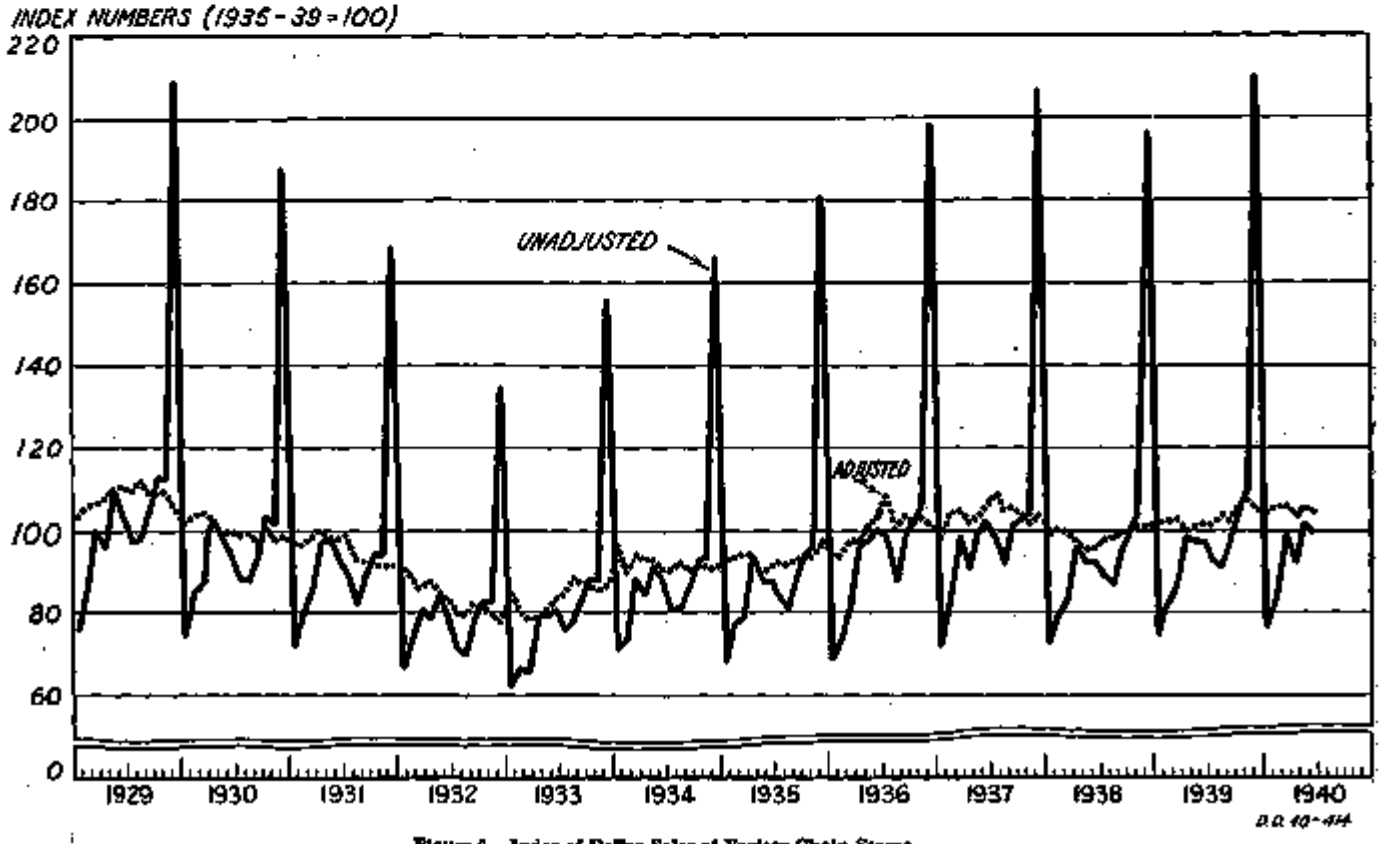

Figure 6.—Index of Dollar Sales of Variety Chain Stores.